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**Attachment B - Revised Stormwater Data** 

# 2.4 Hydrology

**Table 2.1**Existing Conditions Drainage Area Summary

Drainage Area Designation			Time of Concentration (minutes)
Existing Drainage Area 1S	0.019	98	6.0
Existing Drainage Area 2S	1.00	58	13.9
Total	1.02	48	

**Table 2.2**Proposed Conditions Drainage Area Summary

Drainage Area Designation	Drainage Area Size(acres)	Composite Runoff Curve Number (RCN)	Time of Concentration (minutes)
Proposed Drainage Area 1S	0.020	98	6.0
Proposed Drainage Area 0.259 2S		44	6.0
Proposed Drainage Area 0.709 3S		49	7.7
Proposed Drainage Area 0.033 4S		98	6.0
Total	1.02	51	

**Table 2.3** Design Rainfall Depths

Storm Event	Rainfall Depth (inches)
2-Year	3.24
10-Year	4.89
25-Year	6.18
100-Year	8.83

**Table 2.4**Existing Peak Discharge Rates – Design Point 1

2-Year		10-Year	25-Year	100-Year
Storm Event		Storm Event	Storm Event	Storm Event
(cfs)		(cfs)	(cfs)	(cfs)
Design Point 1	Design Point 1 0.06		0.71	2.08

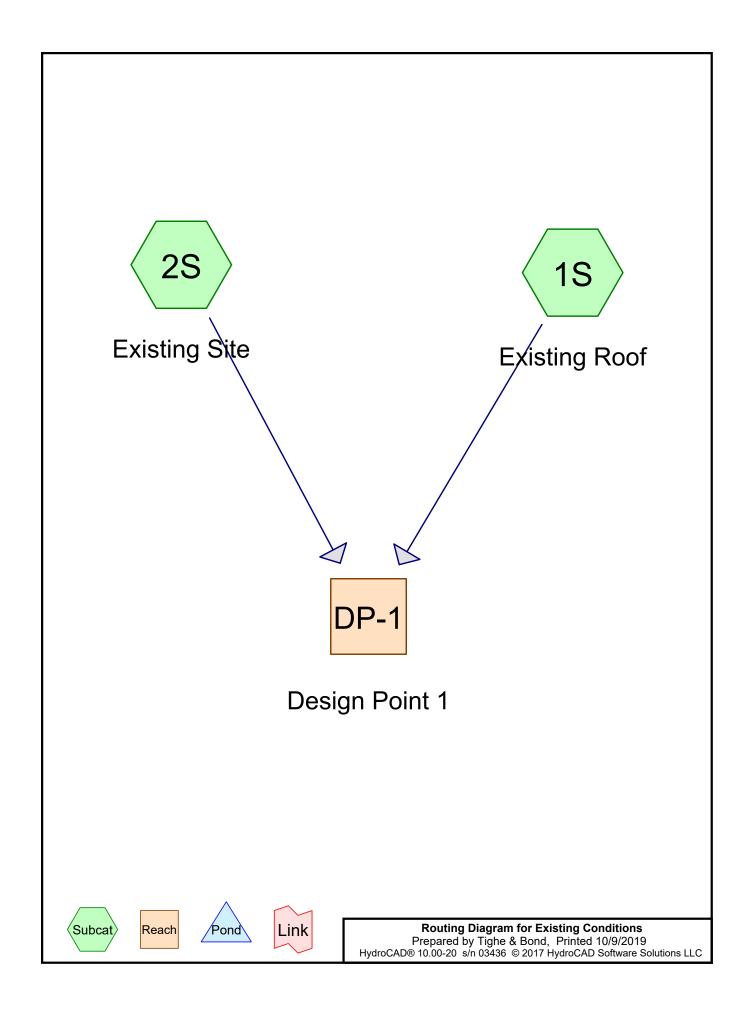
**Table 2.5**Proposed Peak Discharge Rates – Design Point 1

	2-Year Storm Event (cfs)	10-Year Storm Event (cfs)	25-Year Storm Event (cfs)	100-Year Storm Event (cfs)
Design Point 1	0.01	0.25	0.69	1.91
<b>Percent Reduction</b>	83%	3.9%	2.8%	8.1%

**Table 2.6**Total Runoff Volume Comparison

		2-Year 10-Year Storm Storm Event (cf) Event (cf)		25-Year Storm Event (cf)	100-Year Storm Event (cf)
Design	Existing	400	1,838	3,609	8,481
Point 1	Proposed	232	1,330	2,646	6,206

 $<sup>\</sup>verb|J:\G\G0676| Grafton\ Worcester\ St.\ Well \verb|\Permitting\Stormwater\Revised\Stormwater\Numbers.docx| \\$ 



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## **Area Listing (all nodes)**

Area	CN	Description
(sq-ft)		(subcatchment-numbers)
30,907	39	>75% Grass cover, Good, HSG A (2S)
7,147	98	Paved parking, HSG A (2S)
809	98	Roofs, HSG A (1S)
5,623	30	Woods, Good, HSG A (2S)
44,486	48	TOTAL AREA

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# Soil Listing (all nodes)

Area	Soil	Subcatchment
(sq-ft)	Group	Numbers
44,486	HSG A	1S, 2S
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
44,486		<b>TOTAL AREA</b>

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## **Ground Covers (all nodes)**

HSG-A	HSG-B	HSG-C	HSG-D	Other	Total	Ground
(sq-ft)	(sq-ft)	(sq-ft)	(sq-ft)	(sq-ft)	(sq-ft)	Cover
30,907	0	0	0	0	30,907	>75% Grass
						cover, Good
7,147	0	0	0	0	7,147	Paved parking
809	0	0	0	0	809	Roofs
5,623	0	0	0	0	5,623	Woods, Good
44,486	0	0	0	0	44,486	TOTAL AREA

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#### **Existing Conditions**

Type III 24-hr 2-Year Rainfall=3.24"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Roof Runoff Area=809 sf 100.00% Impervious Runoff Depth>2.81"

Tc=6.0 min CN=98 Runoff=0.06 cfs 189 cf

Subcatchment2S: Existing Site Runoff Area=43,677 sf 16.36% Impervious Runoff Depth>0.06"

Flow Length=310' Tc=13.9 min CN=47 Runoff=0.01 cfs 211 cf

Reach DP-1: Design Point 1 Inflow=0.06 cfs 400 cf Outflow=0.06 cfs 400 cf

Total Runoff Area = 44,486 sf Runoff Volume = 400 cf Average Runoff Depth = 0.11" 82.12% Pervious = 36,530 sf 17.88% Impervious = 7,956 sf

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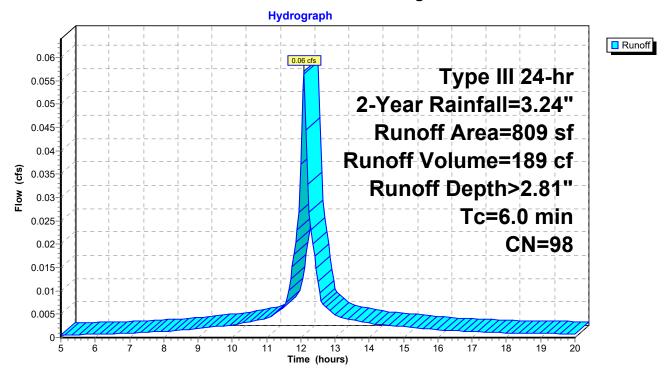
#### **Summary for Subcatchment 1S: Existing Roof**

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 189 cf, Depth> 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.24"

A	rea (sf)	CN E	escription		
	809	98 F	Roofs, HSG	Α	
	809	1	00.00% In	pervious A	urea
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Tc = 6 minutes

### **Subcatchment 1S: Existing Roof**



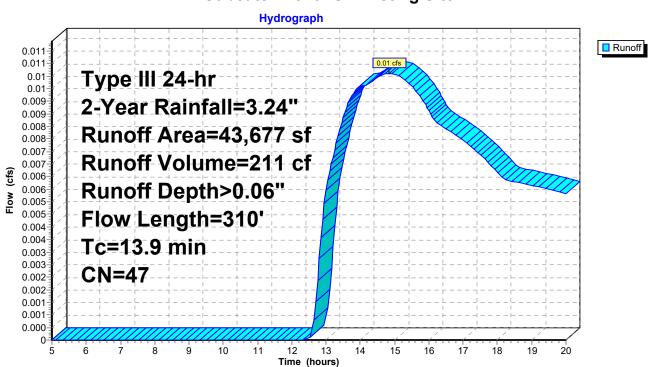
#### **Summary for Subcatchment 2S: Existing Site**

Runoff = 0.01 cfs @ 14.83 hrs, Volume= 211 cf, Depth> 0.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.24"

_	Α	rea (sf)	CN [	Description							
		5,623	30 V	30 Woods, Good, HSG A							
		30,907	39 >	, ,							
*		7,147	98 F	Paved park	ing, HSG A	1					
		43,677	47 \	Veighted A	verage						
		36,530		•	vious Area						
		7,147	1	6.36% Imr	ervious Ar	ea					
		,									
	Tc	Length	Slope	Velocity	Capacity	Description					
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	·					
	12.3	50	0.0200	0.07		Sheet Flow, First 50'					
						Woods: Light underbrush n= 0.400 P2= 3.22"					
	0.5	70	0.0200	2.28		Shallow Concentrated Flow, Next 70'					
						Unpaved Kv= 16.1 fps					
	0.9	150	0.0200	2.87		Shallow Concentrated Flow, Next 150'					
						Paved Kv= 20.3 fps					
	0.2	40	0.0500	3.60		Shallow Concentrated Flow, Last 40'					
						Unpaved Kv= 16.1 fps					
	13.9	310	Total								

#### **Subcatchment 2S: Existing Site**



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#### **Summary for Reach DP-1: Design Point 1**

[40] Hint: Not Described (Outflow=Inflow)

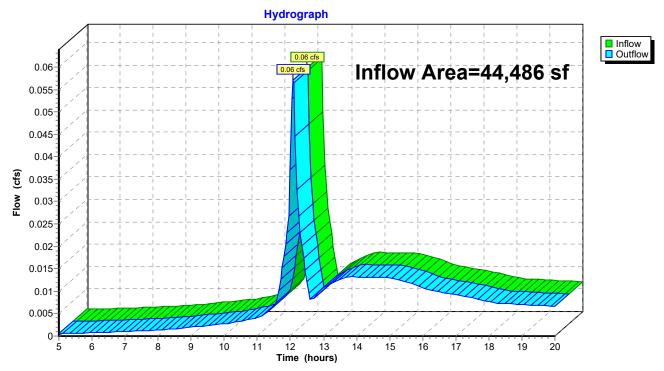
Inflow Area = 44,486 sf, 17.88% Impervious, Inflow Depth > 0.11" for 2-Year event

Inflow = 0.06 cfs @ 12.09 hrs, Volume= 400 cf

Outflow = 0.06 cfs @ 12.09 hrs, Volume= 400 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

# Reach DP-1: Design Point 1



#### **Existing Conditions**

Type III 24-hr 10-Year Rainfall=4.89" Printed 10/9/2019

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Roof Runoff Area=809 sf 100.00% Impervious Runoff Depth>4.32"

Tc=6.0 min CN=98 Runoff=0.09 cfs 291 cf

Subcatchment2S: Existing Site Runoff Area=43,677 sf 16.36% Impervious Runoff Depth>0.43"

Flow Length=310' Tc=13.9 min CN=47 Runoff=0.23 cfs 1,547 cf

Reach DP-1: Design Point 1 Inflow=0.26 cfs 1,838 cf Outflow=0.26 cfs 1,838 cf

Total Runoff Area = 44,486 sf Runoff Volume = 1,838 cf Average Runoff Depth = 0.50" 82.12% Pervious = 36,530 sf 17.88% Impervious = 7,956 sf

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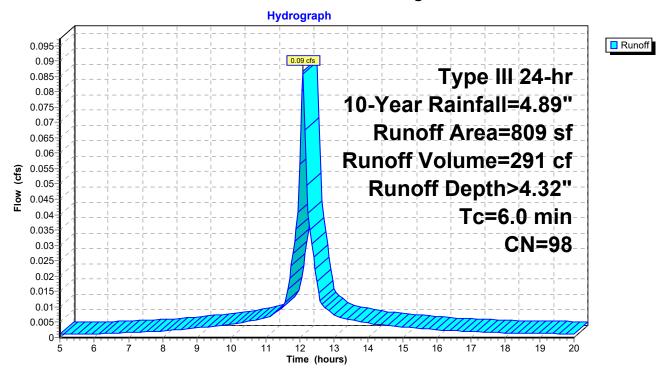
#### **Summary for Subcatchment 1S: Existing Roof**

Runoff = 0.09 cfs @ 12.09 hrs, Volume= 291 cf, Depth> 4.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.89"

A	rea (sf)	CN [	Description				
	809	98 F	Roofs, HSG A				
	809	1	100.00% Impervious Area				
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description		
6.0					Direct Entry, Tc = 6 minutes		

### **Subcatchment 1S: Existing Roof**



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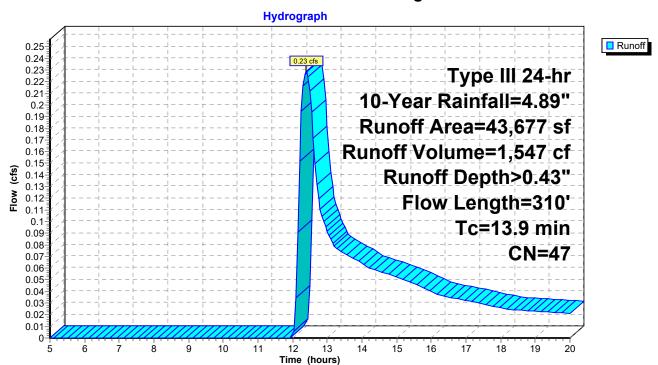
#### **Summary for Subcatchment 2S: Existing Site**

Runoff = 0.23 cfs @ 12.39 hrs, Volume= 1,547 cf, Depth> 0.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.89"

_	Α	rea (sf)	CN E	Description							
		5,623	30 V	30 Woods, Good, HSG A							
	30,907 39 >75% Grass cover, Good, HSG A										
*		7,147	98 F	, ,							
		43,677	47 V	Veighted A	verage						
		36,530			vious Area	l					
		7,147	1	6.36% Imp	pervious Ar	ea					
		•									
	Tc	Length	Slope	Velocity	Capacity	Description					
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	·					
	12.3	50	0.0200	0.07		Sheet Flow, First 50'					
						Woods: Light underbrush n= 0.400 P2= 3.22"					
	0.5	70	0.0200	2.28		Shallow Concentrated Flow, Next 70'					
						Unpaved Kv= 16.1 fps					
	0.9	150	0.0200	2.87		Shallow Concentrated Flow, Next 150'					
						Paved Kv= 20.3 fps					
	0.2	40	0.0500	3.60		Shallow Concentrated Flow, Last 40'					
_						Unpaved Kv= 16.1 fps					
	13.9	310	Total	•							

#### **Subcatchment 2S: Existing Site**



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#### **Summary for Reach DP-1: Design Point 1**

[40] Hint: Not Described (Outflow=Inflow)

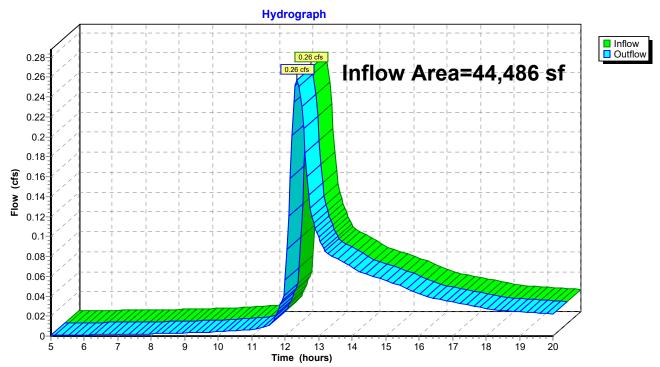
Inflow Area = 44,486 sf, 17.88% Impervious, Inflow Depth > 0.50" for 10-Year event

Inflow = 0.26 cfs @ 12.36 hrs, Volume= 1,838 cf

Outflow = 0.26 cfs @ 12.36 hrs, Volume= 1,838 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

# Reach DP-1: Design Point 1



#### **Existing Conditions**

Type III 24-hr 25-Year Rainfall=6.18"
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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Roof Runoff Area=809 sf 100.00% Impervious Runoff Depth>5.49"

Tc=6.0 min CN=98 Runoff=0.11 cfs 370 cf

Subcatchment2S: Existing Site Runoff Area=43,677 sf 16.36% Impervious Runoff Depth>0.89"

Flow Length=310' Tc=13.9 min CN=47 Runoff=0.65 cfs 3,238 cf

**Reach DP-1: Design Point 1**Inflow=0.71 cfs 3,609 cf
Outflow=0.71 cfs 3,609 cf

Total Runoff Area = 44,486 sf Runoff Volume = 3,609 cf Average Runoff Depth = 0.97" 82.12% Pervious = 36,530 sf 17.88% Impervious = 7,956 sf

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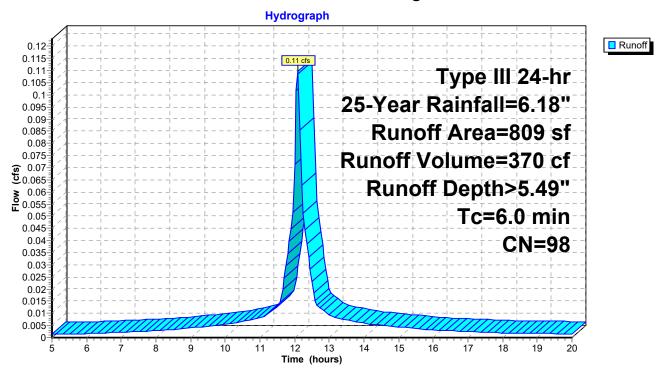
#### **Summary for Subcatchment 1S: Existing Roof**

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 370 cf, Depth> 5.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.18"

A	rea (sf)	CN E	escription		
	809	98 F	Roofs, HSG	Α	
	809	1	00.00% In	pervious A	urea
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Tc = 6 minutes

### **Subcatchment 1S: Existing Roof**

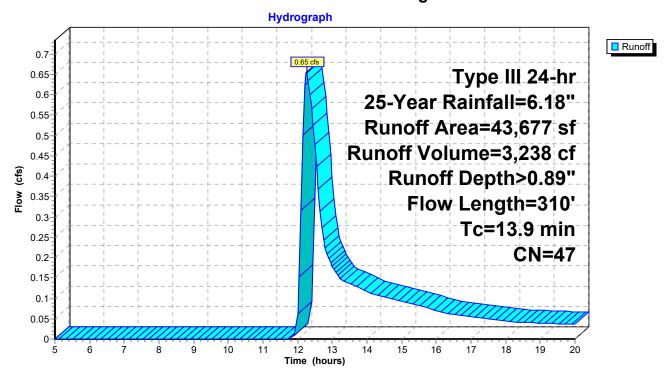


Runoff = 0.65 cfs @ 12.26 hrs, Volume= 3,238 cf, Depth> 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.18"

_	Α	rea (sf)	CN [	Description								
		5,623	30 V	30 Woods, Good, HSG A								
		30,907 39 >75% Grass cover, Good, HSG A										
*		7,147 98 Paved parking, HSG A										
		43,677	47 \	Veighted A	verage							
		36,530			vious Area							
		7,147	1	16.36% Imp	ervious Ar	ea						
		,										
	Tc	Length	Slope	Velocity	Capacity	Description						
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	•						
	12.3	50	0.0200	0.07	· ·	Sheet Flow, First 50'						
						Woods: Light underbrush n= 0.400 P2= 3.22"						
	0.5	70	0.0200	2.28		Shallow Concentrated Flow, Next 70'						
						Unpaved Kv= 16.1 fps						
	0.9	150	0.0200	2.87		Shallow Concentrated Flow, Next 150'						
						Paved Kv= 20.3 fps						
	0.2	40	0.0500	3.60		Shallow Concentrated Flow, Last 40'						
						Unpaved Kv= 16.1 fps						
	13.9	310	Total									

#### **Subcatchment 2S: Existing Site**



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#### **Summary for Reach DP-1: Design Point 1**

[40] Hint: Not Described (Outflow=Inflow)

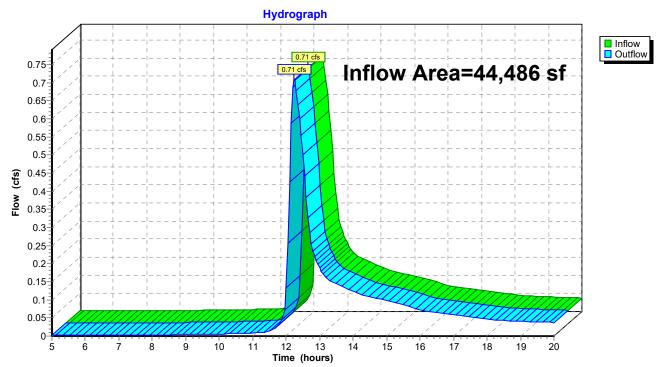
Inflow Area = 44,486 sf, 17.88% Impervious, Inflow Depth > 0.97" for 25-Year event

Inflow = 0.71 cfs @ 12.25 hrs, Volume= 3,609 cf

Outflow = 0.71 cfs @ 12.25 hrs, Volume= 3,609 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

# Reach DP-1: Design Point 1



#### **Existing Conditions**

Type III 24-hr 100-Year Rainfall=8.83" Printed 10/9/2019

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Roof Runoff Area=809 sf 100.00% Impervious Runoff Depth>7.90"

Tc=6.0 min CN=98 Runoff=0.16 cfs 532 cf

Subcatchment2S: Existing Site Runoff Area=43,677 sf 16.36% Impervious Runoff Depth>2.18"

Flow Length=310' Tc=13.9 min CN=47 Runoff=1.99 cfs 7,948 cf

Reach DP-1: Design Point 1 Inflow=2.08 cfs 8,481 cf Outflow=2.08 cfs 8,481 cf

Total Runoff Area = 44,486 sf Runoff Volume = 8,481 cf Average Runoff Depth = 2.29" 82.12% Pervious = 36,530 sf 17.88% Impervious = 7,956 sf

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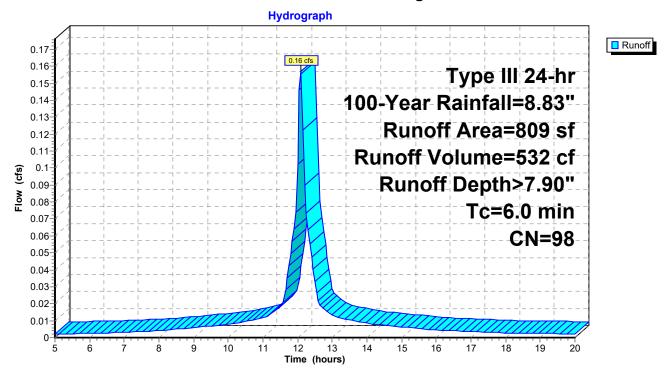
#### **Summary for Subcatchment 1S: Existing Roof**

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 532 cf, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.83"

A	rea (sf)	CN E	escription		
	809	98 F	Roofs, HSG	Α	
	809	1	00.00% In	pervious A	urea
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Tc = 6 minutes

### **Subcatchment 1S: Existing Roof**



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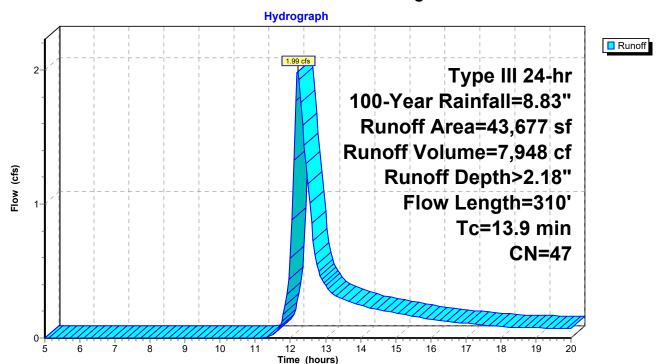
#### **Summary for Subcatchment 2S: Existing Site**

Runoff = 1.99 cfs @ 12.21 hrs, Volume= 7,948 cf, Depth> 2.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.83"

_	Α	rea (sf)	CN [	Description								
		5,623	30 V	30 Woods, Good, HSG A								
		30,907 39 >75% Grass cover, Good, HSG A										
*		7,147 98 Paved parking, HSG A										
		43,677	47 \	Veighted A	verage							
		36,530			vious Area							
		7,147	1	16.36% Imp	ervious Ar	ea						
		,										
	Tc	Length	Slope	Velocity	Capacity	Description						
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	•						
	12.3	50	0.0200	0.07	· ·	Sheet Flow, First 50'						
						Woods: Light underbrush n= 0.400 P2= 3.22"						
	0.5	70	0.0200	2.28		Shallow Concentrated Flow, Next 70'						
						Unpaved Kv= 16.1 fps						
	0.9	150	0.0200	2.87		Shallow Concentrated Flow, Next 150'						
						Paved Kv= 20.3 fps						
	0.2	40	0.0500	3.60		Shallow Concentrated Flow, Last 40'						
						Unpaved Kv= 16.1 fps						
	13.9	310	Total									

### **Subcatchment 2S: Existing Site**



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#### **Summary for Reach DP-1: Design Point 1**

[40] Hint: Not Described (Outflow=Inflow)

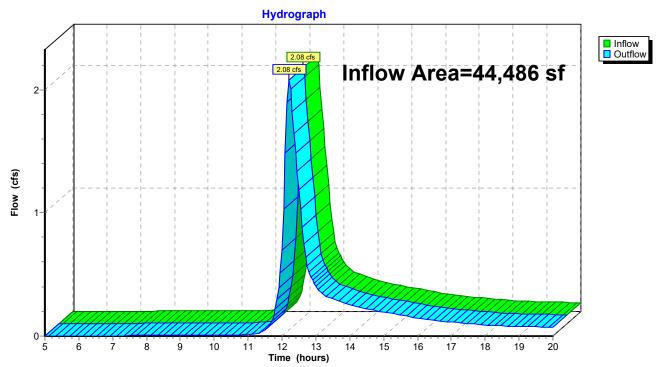
Inflow Area = 44,486 sf, 17.88% Impervious, Inflow Depth > 2.29" for 100-Year event

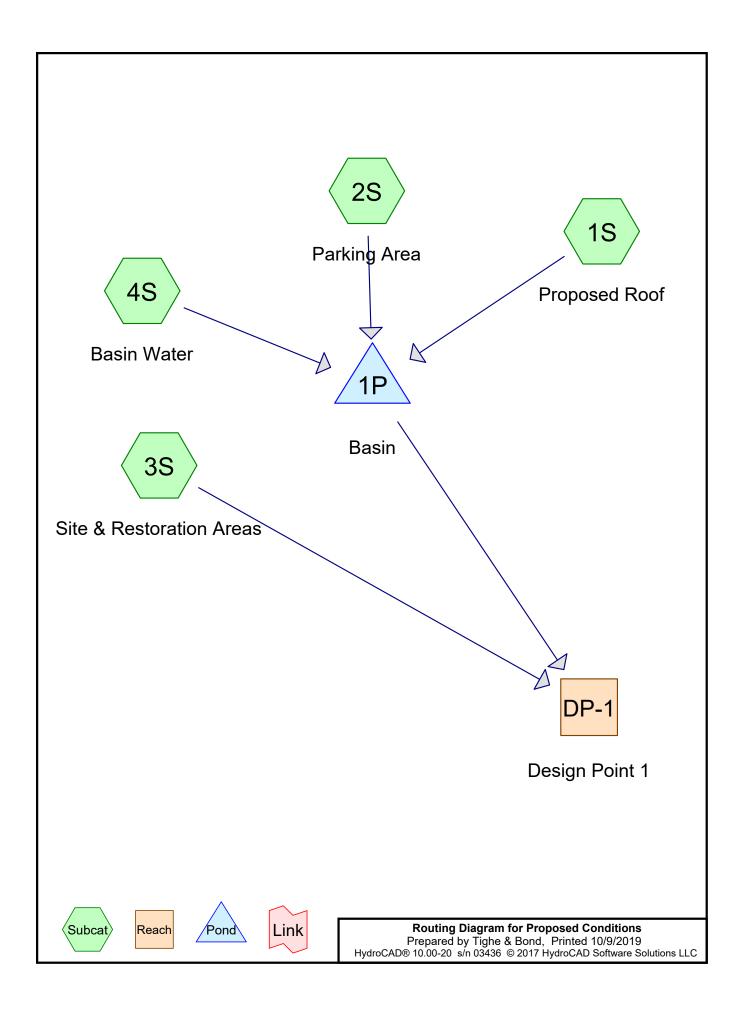
Inflow = 2.08 cfs @ 12.21 hrs, Volume= 8,481 cf

Outflow = 2.08 cfs @ 12.21 hrs, Volume= 8,481 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

# Reach DP-1: Design Point 1





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## **Area Listing (all nodes)**

Area	a CN	Description
(sq-ft	)	(subcatchment-numbers)
20,519	39	>75% Grass cover, Good, HSG A (2S, 3S)
2,670	96	Gravel surface, HSG A (3S)
13,060	30	Meadow, non-grazed, HSG A (3S)
3,382	98	Paved driveway, HSG A (3S)
2,546	98	Paved parking, HSG A (2S, 3S)
871	J 98	Roofs, HSG A (1S)
1,438	98	Water Surface, HSG A (4S)
44,480	6 51	TOTAL AREA

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# Soil Listing (all nodes)

Area	Soil	Subcatchment
(sq-ft)	Group	Numbers
44,486	HSG A	1S, 2S, 3S, 4S
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
44,486		<b>TOTAL AREA</b>

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## **Ground Covers (all nodes)**

HSG-A	HSG-B	HSG-C	HSG-D	Other	Total	Ground
(sq-ft)	(sq-ft)	(sq-ft)	(sq-ft)	(sq-ft)	(sq-ft)	Cover
20,519	0	0	0	0	20,519	>75% Grass cover, Good
2,670	0	0	0	0	2,670	Gravel surface
13,060	0	0	0	0	13,060	Meadow, non-grazed
3,382	0	0	0	0	3,382	Paved driveway
2,546	0	0	0	0	2,546	Paved parking
871	0	0	0	0	871	Roofs
1,438	0	0	0	0	1,438	Water Surface
44,486	0	0	0	0	44,486	TOTAL AREA

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#### **Proposed Conditions**

Type III 24-hr 2-Year Rainfall=3.24"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Proposed Roof Runoff Area=871 sf 100.00% Impervious Runoff Depth>2.81"

Tc=6.0 min CN=98 Runoff=0.06 cfs 204 cf

Subcatchment2S: Parking Area Runoff Area=11,288 sf 9.09% Impervious Runoff Depth>0.02"

Tc=6.0 min CN=44 Runoff=0.00 cfs 22 cf

Subcatchment3S: Site & Restoration Runoff Area=30,889 sf 15.87% Impervious Runoff Depth>0.09"

Flow Length=251' Tc=7.7 min CN=49 Runoff=0.01 cfs 232 cf

Subcatchment4S: Basin Water Runoff Area=1,438 sf 100.00% Impervious Runoff Depth>2.81"

Tc=6.0 min CN=98 Runoff=0.10 cfs 337 cf

Reach DP-1: Design Point 1 Inflow=0.01 cfs 232 cf

Outflow=0.01 cfs 232 cf

Pond 1P: Basin Peak Elev=309.09' Storage=92 cf Inflow=0.16 cfs 562 cf

Discarded=0.06 cfs 561 cf Primary=0.00 cfs 0 cf Outflow=0.06 cfs 561 cf

Total Runoff Area = 44,486 sf Runoff Volume = 795 cf Average Runoff Depth = 0.21" 81.48% Pervious = 36,249 sf 18.52% Impervious = 8,237 sf

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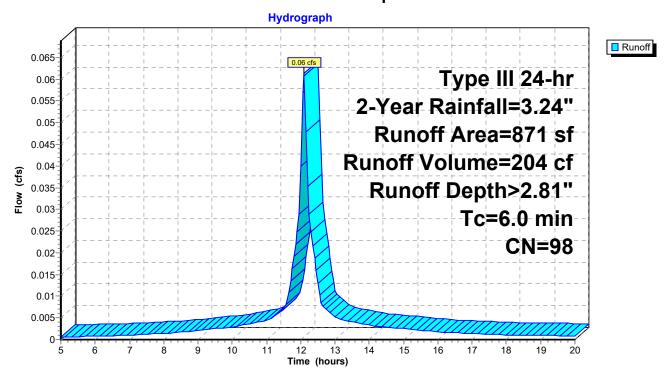
#### **Summary for Subcatchment 1S: Proposed Roof**

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 204 cf, Depth> 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.24"

A	rea (sf)	CN [	Description						
	871	98 F	Roofs, HSC	Α					
	871	1	100.00% Impervious Area						
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description				
6.0					Direct Entry, Tc = 6 min				

#### **Subcatchment 1S: Proposed Roof**



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#### **Summary for Subcatchment 2S: Parking Area**

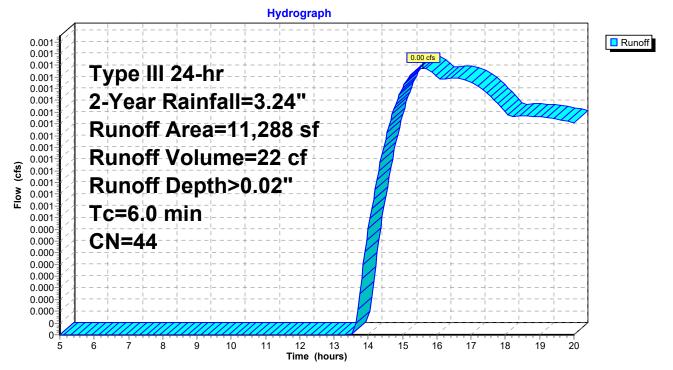
Runoff = 0.00 cfs @ 15.58 hrs, Volume= 22 cf, Depth> 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.24"

Area (s	f) CN	Description	Description							
1,02	6 98	Paved park	Paved parking, HSG A							
10,26	2 39	>75% Gras	>75% Grass cover, Good, HSG A							
11,28	8 44	Weighted A	Weighted Average							
10,26	2	90.91% Pei	90.91% Pervious Area							
1,02	6	9.09% Impe	ervious Are	a						
Tc Lenç (min) (fe	,	,	Capacity (cfs)	Description						
6.0				Direct Entry, Tc = 6 min						

\_ . . . . . . . . . . . .

# **Subcatchment 2S: Parking Area**



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# **Summary for Subcatchment 3S: Site & Restoration Areas**

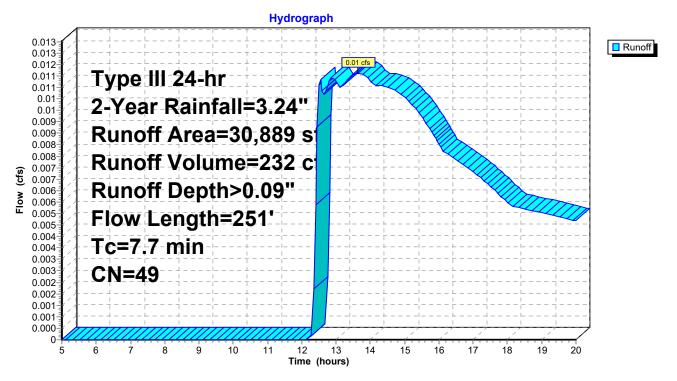
Runoff = 0.01 cfs @ 13.64 hrs, Volume= 232 cf, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.24"

_	Α	rea (sf)	CN [	Description							
		10,257	39 >	75% Grass cover, Good, HSG A							
	1,520 98 Paved parking, HSG A										
*		3,382	98 F	Paved drive	way, HSG	A					
		13,060	30 N	∕leadow, no	on-grazed,	HSG A					
		2,670	96 (	Gravel surfa	ace, HSG A	4					
		30,889	49 \	Veighted A	verage						
		25,987	3	84.13% Pei	vious Area	l					
		4,902	1	5.87% Imp	pervious Ar	ea					
	Тс	Length	Slope	•		Description					
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
	5.6	50	0.0200	0.15		Sheet Flow, First 50'					
						Grass: Short n= 0.150 P2= 3.22"					
	0.3	45	0.0200	2.28		Shallow Concentrated Flow, Next 45'					
						Unpaved Kv= 16.1 fps					
	1.3	113	0.0050	1.44		Shallow Concentrated Flow, Next 113'					
						Paved Kv= 20.3 fps					
	0.5	43	0.0500	1.57		Shallow Concentrated Flow, Last 43'					
_						Short Grass Pasture Kv= 7.0 fps					
	7.7	251	Total								

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#### **Subcatchment 3S: Site & Restoration Areas**



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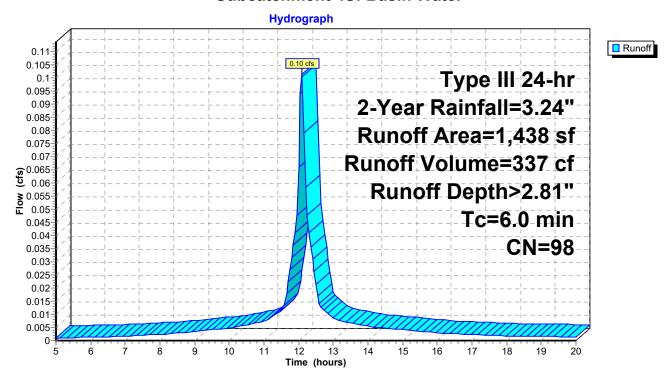
#### **Summary for Subcatchment 4S: Basin Water**

Runoff = 0.10 cfs @ 12.09 hrs, Volume= 337 cf, Depth> 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.24"

A	rea (sf)	CN E	Description							
	1,438	98 V	Water Surface, HSG A							
	1,438	1	100.00% Impervious Area							
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description					
6.0					Direct Entry, Tc = 6 min					

#### Subcatchment 4S: Basin Water



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#### **Summary for Reach DP-1: Design Point 1**

[40] Hint: Not Described (Outflow=Inflow)

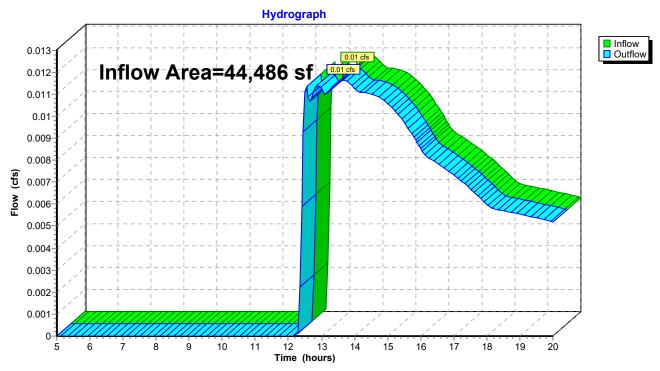
Inflow Area = 44,486 sf, 18.52% Impervious, Inflow Depth > 0.06" for 2-Year event

Inflow = 0.01 cfs @ 13.64 hrs, Volume= 232 cf

Outflow = 0.01 cfs @ 13.64 hrs, Volume= 232 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

# Reach DP-1: Design Point 1



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#### **Summary for Pond 1P: Basin**

[82] Warning: Early inflow requires earlier time span

Inflow Area = 13,597 sf, 24.53% Impervious, Inflow Depth > 0.50" for 2-Year event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 562 cf
Outflow = 0.06 cfs @ 12.35 hrs, Volume= 561 cf, Atten= 64%, Lag= 15.6 min
Discarded = 0.00 cfs @ 12.35 hrs, Volume= 561 cf
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 309.09' @ 12.35 hrs Surf.Area= 1,039 sf Storage= 92 cf

Plug-Flow detention time= 10.9 min calculated for 559 cf (99% of inflow) Center-of-Mass det. time= 9.8 min ( 759.0 - 749.2 )

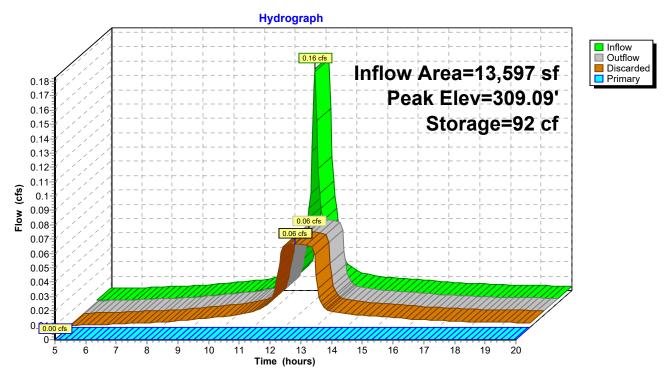
Invert	Avail	Storogo	Storage Description	n	
309.00'	309.00' 3,073 cf		Custom Stage Data (Irregular)Listed below (Recalc)		
vation Surf.Area		Perim.	Inc.Store	Cum.Store	Wet.Area
	(sq-ft)	(feet)	(cubic-feet)	(cubic-feet)	(sq-ft)
	995	190.0	0	0	995
	1,540	229.0	1,258	1,258	2,312
	2,106	166.0	1,816	3,073	4,302
Routing	Inv	ert Outle	et Devices		
Discarded 309		00' <b>2.41</b>	2.410 in/hr Exfiltration over Surface area		
		Cond	ductivity to Groundy	vater Elevation = 10	00.00'
#2 Primary			,		
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80					
			` '		
					3 2 67 2 65 2 65 2 65
			`		
) ) )	Routing	309.00' Surf.Area (sq-ft) 995 1,540 2,106 Routing Inv	309.00' 3,073 cf  Surf.Area Perim. (sq-ft) (feet) 995 190.0 1,540 229.0 2,106 166.0  Routing Invert Outle Conc Primary 310.50' 10.0 Head 2.50 Coef	309.00' 3,073 cf Custom Stage Da  Surf.Area Perim. Inc.Store (sq-ft) (feet) (cubic-feet) 995 190.0 0 1,540 229.0 1,258 2,106 166.0 1,816  Routing Invert Outlet Devices Discarded 309.00' 2.410 in/hr Exfiltration Conductivity to Groundw Primary 310.50' 10.0' long x 6.0' bread Head (feet) 0.20 0.40 (2.50 3.00 3.50 4.00 4 Coef. (English) 2.37 2.50	309.00' 3,073 cf Custom Stage Data (Irregular)Listed (sq-ft) (feet) (cubic-feet) (cubic-feet) (cubic-feet) (sq-ft) (feet) (cubic-feet)

**Discarded OutFlow** Max=0.06 cfs @ 12.35 hrs HW=309.09' (Free Discharge) 1=Exfiltration (Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=309.00' (Free Discharge) 2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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#### Pond 1P: Basin



## **Proposed Conditions**

Type III 24-hr 10-Year Rainfall=4.89"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Proposed Roof Runoff Area=871 sf 100.00% Impervious Runoff Depth>4.32"

Tc=6.0 min CN=98 Runoff=0.09 cfs 313 cf

Subcatchment2S: Parking Area Runoff Area=11,288 sf 9.09% Impervious Runoff Depth>0.31"

Tc=6.0 min CN=44 Runoff=0.04 cfs 287 cf

Subcatchment3S: Site & Restoration Runoff Area=30,889 sf 15.87% Impervious Runoff Depth>0.52"

Flow Length=251' Tc=7.7 min CN=49 Runoff=0.25 cfs 1,330 cf

Subcatchment4S: Basin Water Runoff Area=1,438 sf 100.00% Impervious Runoff Depth>4.32"

Tc=6.0 min CN=98 Runoff=0.15 cfs 517 cf

Reach DP-1: Design Point 1 Inflow=0.25 cfs 1,330 cf

Outflow=0.25 cfs 1,330 cf

Pond 1P: Basin

Peak Elev=309.23' Storage=241 cf Inflow=0.25 cfs 1,118 cf

Discarded=0.06 cfs 1,115 cf Primary=0.00 cfs 0 cf Outflow=0.06 cfs 1,115 cf

Total Runoff Area = 44,486 sf Runoff Volume = 2,449 cf Average Runoff Depth = 0.66" 81.48% Pervious = 36,249 sf 18.52% Impervious = 8,237 sf

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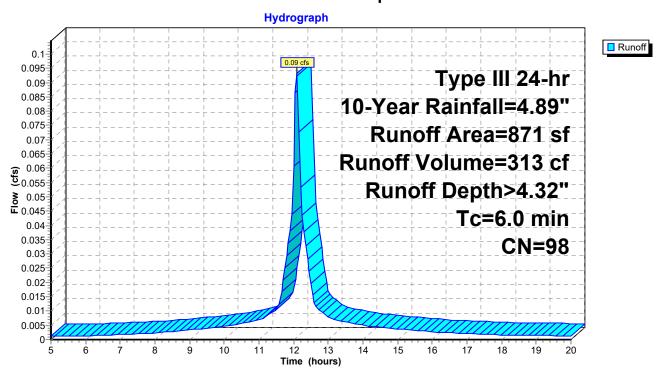
## **Summary for Subcatchment 1S: Proposed Roof**

Runoff = 0.09 cfs @ 12.09 hrs, Volume= 313 cf, Depth> 4.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.89"

A	rea (sf)	CN [	Description		
	871	98 F	Roofs, HSC	Α	
	871	1	00.00% In	npervious A	rea
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	-		•		Direct Entry, Tc = 6 min

### **Subcatchment 1S: Proposed Roof**



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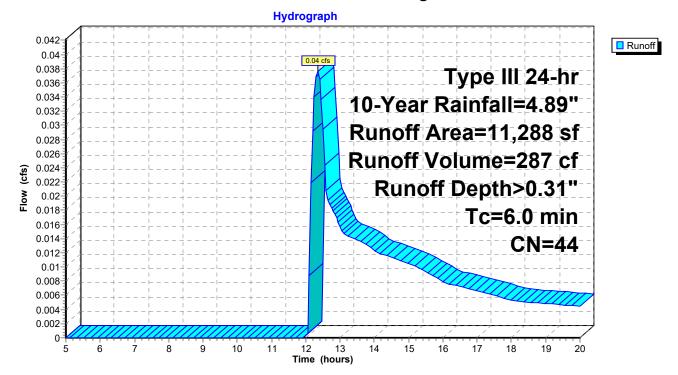
### **Summary for Subcatchment 2S: Parking Area**

Runoff = 0.04 cfs @ 12.34 hrs, Volume= 287 cf, Depth> 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.89"

Are	ea (sf)	CN	Description							
	1,026	98	Paved parking, HSG A							
1	0,262	39	>75% Ġras	s cover, Go	ood, HSG A					
1	1,288	44	Weighted A	verage						
1	0,262		90.91% Pervious Area							
	1,026		9.09% Impe	ervious Area	а					
Tc	Length	Slope	Velocity	Capacity	Description					
(min)	(feet)	(ft/ft)	,	(cfs)	Description					
	(IEEL)	(11/11)	(II/Sec)	(CIS)						
6.0					Direct Entry, Tc = 6 min					

## **Subcatchment 2S: Parking Area**



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# **Summary for Subcatchment 3S: Site & Restoration Areas**

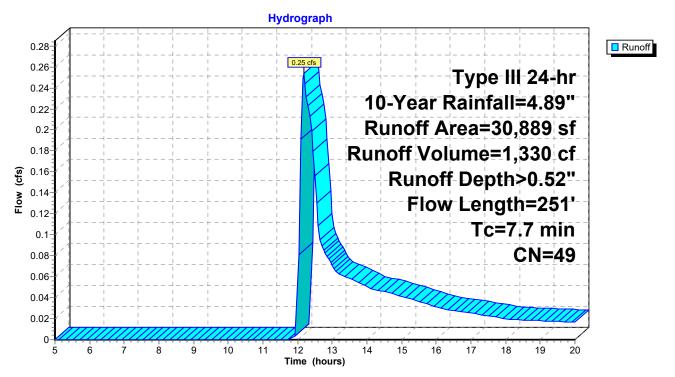
Runoff = 0.25 cfs @ 12.17 hrs, Volume= 1,330 cf, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.89"

_	Α	rea (sf)	CN [	Description							
		10,257	39 >	>75% Grass cover, Good, HSG A							
		1,520	98 F	Paved park	Paved parking, HSG A						
*		3,382	98 F	Paved drive	way, HSG	A					
		13,060	30 N	∕leadow, no	on-grazed,	HSG A					
		2,670	96 (	Gravel surfa	ace, HSG A	4					
		30,889	49 \	Veighted A	verage						
		25,987	3	84.13% Pei	vious Area	l					
		4,902	1	5.87% Imp	pervious Ar	ea					
	Тс	Length	Slope	•		Description					
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
	5.6	50	0.0200	0.15		Sheet Flow, First 50'					
						Grass: Short n= 0.150 P2= 3.22"					
	0.3	45	0.0200	2.28		Shallow Concentrated Flow, Next 45'					
						Unpaved Kv= 16.1 fps					
	1.3	113	0.0050	1.44		Shallow Concentrated Flow, Next 113'					
						Paved Kv= 20.3 fps					
	0.5	43	0.0500	1.57		Shallow Concentrated Flow, Last 43'					
_						Short Grass Pasture Kv= 7.0 fps					
	7.7	251	Total								

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#### **Subcatchment 3S: Site & Restoration Areas**



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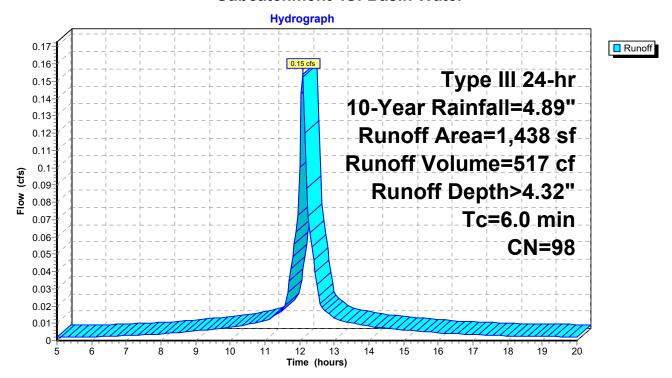
## **Summary for Subcatchment 4S: Basin Water**

Runoff = 0.15 cfs @ 12.09 hrs, Volume= 517 cf, Depth> 4.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.89"

A	rea (sf)	CN E	Description						
	1,438	98 V	Water Surface, HSG A						
	1,438	1	100.00% Impervious Area						
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description				
6.0					Direct Entry, Tc = 6 min				

#### Subcatchment 4S: Basin Water



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## **Summary for Reach DP-1: Design Point 1**

[40] Hint: Not Described (Outflow=Inflow)

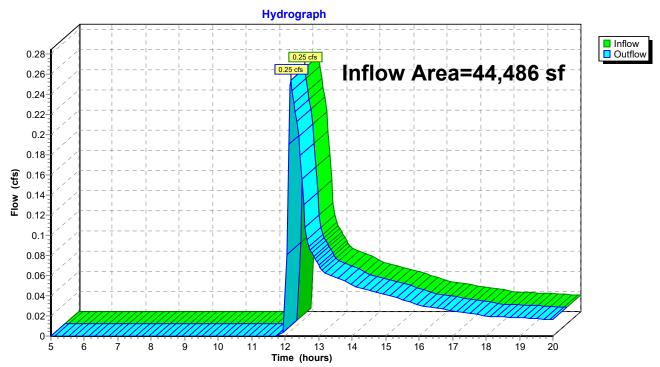
Inflow Area = 44,486 sf, 18.52% Impervious, Inflow Depth > 0.36" for 10-Year event

Inflow = 0.25 cfs @ 12.17 hrs, Volume= 1,330 cf

Outflow = 0.25 cfs @ 12.17 hrs, Volume= 1,330 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

# Reach DP-1: Design Point 1



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### **Summary for Pond 1P: Basin**

[82] Warning: Early inflow requires earlier time span

Inflow Area = 13,597 sf, 24.53% Impervious, Inflow Depth > 0.99" for 10-Year event
Inflow = 0.25 cfs @ 12.09 hrs, Volume= 1,118 cf
Outflow = 0.06 cfs @ 12.57 hrs, Volume= 1,115 cf, Atten= 76%, Lag= 28.5 min
Discarded = 0.00 cfs @ 12.57 hrs, Volume= 1,115 cf
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 309.23' @ 12.57 hrs Surf.Area= 1,109 sf Storage= 241 cf

Plug-Flow detention time= 25.4 min calculated for 1,115 cf (100% of inflow) Center-of-Mass det. time= 24.2 min (799.1 - 774.9)

Valuma	Invort	Avail	Storogo	Storage Description	<b>n</b>			
Volume	Invert		.Storage					
#1	309.00'		3,073 cf	Custom Stage Dat	<b>ta (Irregular)</b> Listed	below (Recalc)		
Elevation	on Su	ırf.Area	Perim.	Inc.Store	Cum.Store	Wet.Area		
(fee	et)	(sq-ft)	(feet)	(cubic-feet)	(cubic-feet)	(sq-ft)		
309.0	00	995	190.0	0	0	995		
310.0	00	1,540	229.0	1,258	1,258	2,312		
311.0	00	2,106	166.0	1,816	3,073	4,302		
Device	Routing	Inv	ert Outle	et Devices				
#1	Discarded	309.	00' <b>2.41</b>	2.410 in/hr Exfiltration over Surface area				
			Cond	ductivity to Groundw	ater Elevation = 10	0.00'		
#2	Primary	310.		•				
	,		Head	d (feet) 0.20 0.40 (	0.60 0.80 1.00 1.2	20 1.40 1.60 1.80 2.00		
	2.50 3.00 3.50 4.00 4.50 5.00 5.50							
						267 265 265 265		
				` ` ,				
#1 #2	Discarded Primary		Cond 50' 10.0 Head 2.50 Coef	ductivity to Groundw ' long x 6.0' breadt d (feet) 0.20 0.40 ( 3.00 3.50 4.00 4.	vater Elevation = 10 th Broad-Crested 0.60 0.80 1.00 1.2 50 5.00 5.50 51 2.70 2.68 2.68	0.00' <b>Rectangular Weir</b> 20 1.40 1.60 1.80 2.00  2.67 2.65 2.65 2.65		

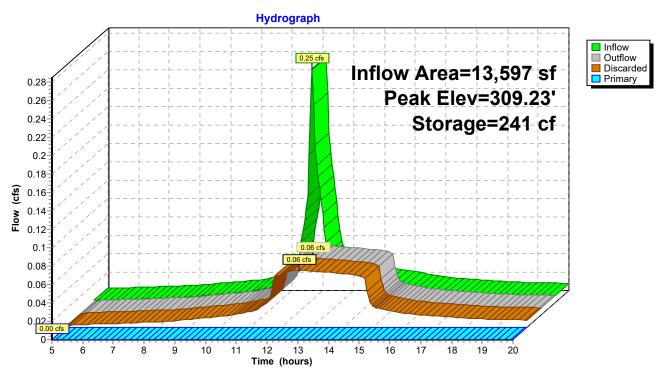
Discarded OutFlow Max=0.06 cfs @ 12.57 hrs HW=309.23' (Free Discharge) 1=Exfiltration ( Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=309.00' (Free Discharge) 2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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### Pond 1P: Basin



### **Proposed Conditions**

Type III 24-hr 25-Year Rainfall=6.18"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Proposed Roof Runoff Area=871 sf 100.00% Impervious Runoff Depth>5.49"

Tc=6.0 min CN=98 Runoff=0.12 cfs 399 cf

Subcatchment2S: Parking Area Runoff Area=11,288 sf 9.09% Impervious Runoff Depth>0.70"

Tc=6.0 min CN=44 Runoff=0.14 cfs 661 cf

**Subcatchment3S: Site & Restoration** Runoff Area=30,889 sf 15.87% Impervious Runoff Depth>1.03"

Flow Length=251' Tc=7.7 min CN=49 Runoff=0.69 cfs 2,646 cf

Subcatchment4S: Basin Water Runoff Area=1,438 sf 100.00% Impervious Runoff Depth>5.49"

Tc=6.0 min CN=98 Runoff=0.20 cfs 658 cf

Reach DP-1: Design Point 1 Inflow=0.69 cfs 2,646 cf

Outflow=0.69 cfs 2,646 cf

Pond 1P: Basin Peak Elev=309.44' Storage=492 cf Inflow=0.44 cfs 1,718 cf

Discarded=0.07 cfs 1,714 cf Primary=0.00 cfs 0 cf Outflow=0.07 cfs 1,714 cf

Total Runoff Area = 44,486 sf Runoff Volume = 4,364 cf Average Runoff Depth = 1.18" 81.48% Pervious = 36,249 sf 18.52% Impervious = 8,237 sf

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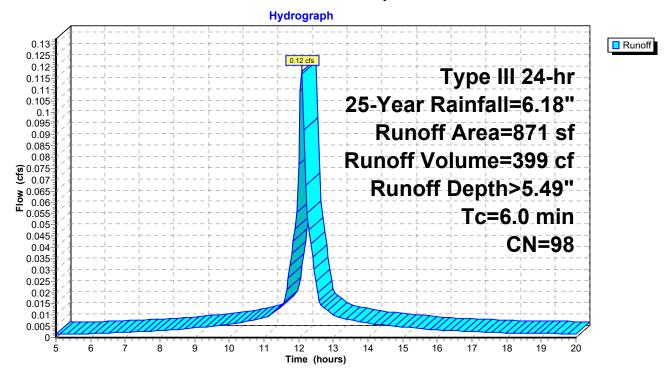
## **Summary for Subcatchment 1S: Proposed Roof**

Runoff = 0.12 cfs @ 12.09 hrs, Volume= 399 cf, Depth> 5.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.18"

A	rea (sf)	CN E	Description		
	871	98 F	Roofs, HSG	Α	
	871	1	00.00% Im	npervious A	urea
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Tc = 6 min

# **Subcatchment 1S: Proposed Roof**



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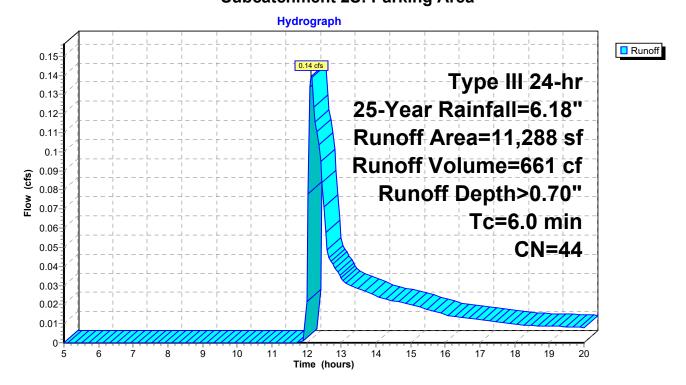
## **Summary for Subcatchment 2S: Parking Area**

Runoff = 0.14 cfs @ 12.14 hrs, Volume= 661 cf, Depth> 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.18"

Area (s	f) CN	Description	Description							
1,02	6 98	Paved park	Paved parking, HSG A							
10,26	2 39	>75% Gras	s cover, Go	ood, HSG A						
11,28	8 44	Weighted A	verage							
10,26	2	90.91% Pei	90.91% Pervious Area							
1,02	6	9.09% Impe	ervious Are	a						
Tc Lenç (min) (fe	,	,	Capacity (cfs)	Description						
6.0				Direct Entry, Tc = 6 min						

# **Subcatchment 2S: Parking Area**



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# **Summary for Subcatchment 3S: Site & Restoration Areas**

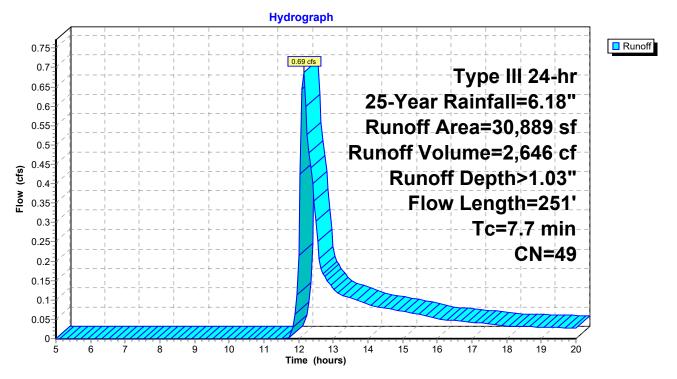
Runoff = 0.69 cfs @ 12.14 hrs, Volume= 2,646 cf, Depth> 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.18"

_	Д	rea (sf)	CN I	Description							
		10,257	39 :	>75% Grass cover, Good, HSG A							
		1,520	98 I	Paved park	Paved parking, HSG A						
*		3,382	98 I	Paved drive	eway, HSG	A					
		13,060	30 [	Meadow, n	on-grazed,	HSG A					
_		2,670	96 (	Gravel surf	ace, HSG A	4					
		30,889	49 \	Neighted A	verage						
		25,987	8	34.13% Pe	rvious Area	l					
		4,902	•	15.87% lm <mark>։</mark>	pervious Ar	ea					
	Тс	Length	Slope	Velocity	Capacity	Description					
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
	5.6	50	0.0200	0.15		Sheet Flow, First 50'					
						Grass: Short n= 0.150 P2= 3.22"					
	0.3	45	0.0200	2.28		Shallow Concentrated Flow, Next 45'					
						Unpaved Kv= 16.1 fps					
	1.3	113	0.0050	1.44		Shallow Concentrated Flow, Next 113'					
						Paved Kv= 20.3 fps					
	0.5	43	0.0500	1.57		Shallow Concentrated Flow, Last 43'					
_						Short Grass Pasture Kv= 7.0 fps					
	77	251	Total								

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### **Subcatchment 3S: Site & Restoration Areas**



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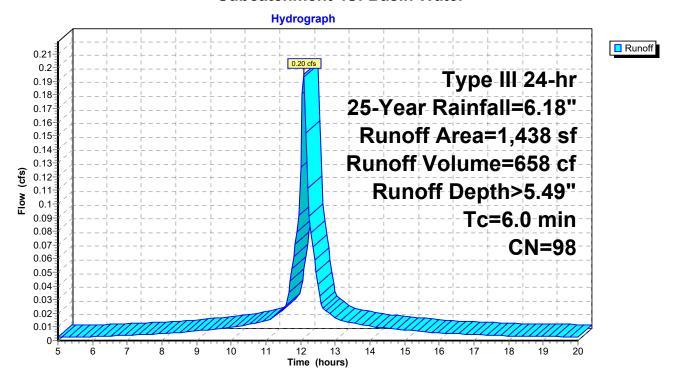
## **Summary for Subcatchment 4S: Basin Water**

Runoff = 0.20 cfs @ 12.09 hrs, Volume= 658 cf, Depth> 5.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.18"

A	rea (sf)	CN E	<b>Description</b>						
	1,438	98 V	Water Surface, HSG A						
	1,438	1	100.00% Impervious Area						
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description				
6.0					Direct Entry, Tc = 6 min				

#### Subcatchment 4S: Basin Water



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### **Summary for Reach DP-1: Design Point 1**

[40] Hint: Not Described (Outflow=Inflow)

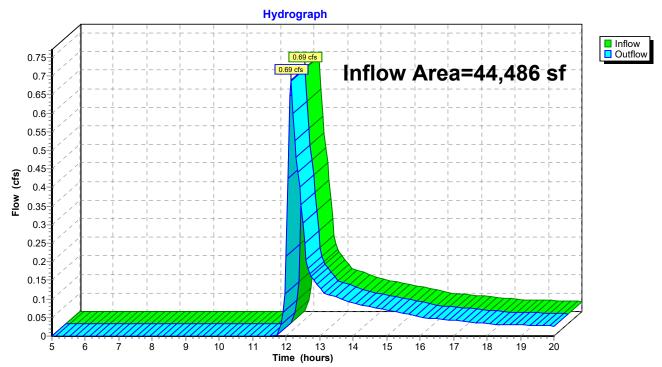
Inflow Area = 44,486 sf, 18.52% Impervious, Inflow Depth > 0.71" for 25-Year event

Inflow = 0.69 cfs @ 12.14 hrs, Volume= 2,646 cf

Outflow = 0.69 cfs @ 12.14 hrs, Volume= 2,646 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

# Reach DP-1: Design Point 1



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### **Summary for Pond 1P: Basin**

[82] Warning: Early inflow requires earlier time span

Inflow Area = 13,597 sf, 24.53% Impervious, Inflow Depth > 1.52" for 25-Year event
Inflow = 0.44 cfs @ 12.10 hrs, Volume= 1,718 cf
Outflow = 0.07 cfs @ 12.87 hrs, Volume= 1,714 cf, Atten= 85%, Lag= 46.3 min
Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 309.44' @ 12.87 hrs Surf.Area= 1,222 sf Storage= 492 cf

Plug-Flow detention time= 59.7 min calculated for 1,713 cf (100% of inflow) Center-of-Mass det. time= 58.4 min (840.9 - 782.4)

Valuma	Invort	Avail	Storogo	Storage Description	<b>n</b>			
Volume	Invert		.Storage					
#1	309.00'		3,073 cf	Custom Stage Dat	<b>ta (Irregular)</b> Listed	below (Recalc)		
Elevation	on Su	ırf.Area	Perim.	Inc.Store	Cum.Store	Wet.Area		
(fee	et)	(sq-ft)	(feet)	(cubic-feet)	(cubic-feet)	(sq-ft)		
309.0	00	995	190.0	0	0	995		
310.0	00	1,540	229.0	1,258	1,258	2,312		
311.0	00	2,106	166.0	1,816	3,073	4,302		
Device	Routing	Inv	ert Outle	et Devices				
#1	Discarded	309.	00' <b>2.41</b>	2.410 in/hr Exfiltration over Surface area				
			Cond	ductivity to Groundw	ater Elevation = 10	0.00'		
#2	Primary	310.		•				
	,		Head	d (feet) 0.20 0.40 (	0.60 0.80 1.00 1.2	20 1.40 1.60 1.80 2.00		
	2.50 3.00 3.50 4.00 4.50 5.00 5.50							
						267 265 265 265		
				` ` ,				
#1 #2	Discarded Primary		Cond 50' 10.0 Head 2.50 Coef	ductivity to Groundw ' long x 6.0' breadt d (feet) 0.20 0.40 ( 3.00 3.50 4.00 4.	vater Elevation = 10 th Broad-Crested 0.60 0.80 1.00 1.2 50 5.00 5.50 51 2.70 2.68 2.68	0.00' <b>Rectangular Weir</b> 20 1.40 1.60 1.80 2.00  2.67 2.65 2.65 2.65		

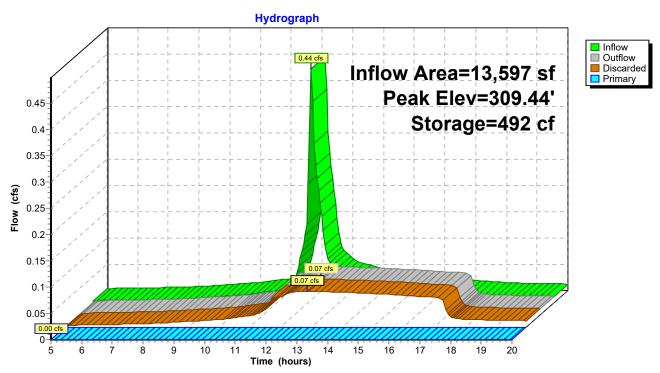
**Discarded OutFlow** Max=0.07 cfs @ 12.87 hrs HW=309.44' (Free Discharge) 1=Exfiltration (Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=309.00' (Free Discharge) 2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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### Pond 1P: Basin



## **Proposed Conditions**

Type III 24-hr 100-Year Rainfall=8.83"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Proposed Roof Runoff Area=871 sf 100.00% Impervious Runoff Depth>7.90"

Tc=6.0 min CN=98 Runoff=0.17 cfs 573 cf

Subcatchment2S: Parking Area Runoff Area=11,288 sf 9.09% Impervious Runoff Depth>1.87"

Tc=6.0 min CN=44 Runoff=0.54 cfs 1,756 cf

**Subcatchment3S: Site & Restoration** Runoff Area=30,889 sf 15.87% Impervious Runoff Depth>2.41"

Flow Length=251' Tc=7.7 min CN=49 Runoff=1.91 cfs 6,206 cf

Subcatchment4S: Basin Water Runoff Area=1,438 sf 100.00% Impervious Runoff Depth>7.90"

Tc=6.0 min CN=98 Runoff=0.28 cfs 946 cf

Reach DP-1: Design Point 1 Inflow=1.91 cfs 6,206 cf

Outflow=1.91 cfs 6,206 cf

Pond 1P: Basin Peak Elev=310.05' Storage=1,331 cf Inflow=0.98 cfs 3,276 cf

Discarded=0.09 cfs 2,800 cf Primary=0.00 cfs 0 cf Outflow=0.09 cfs 2,800 cf

Total Runoff Area = 44,486 sf Runoff Volume = 9,482 cf Average Runoff Depth = 2.56" 81.48% Pervious = 36,249 sf 18.52% Impervious = 8,237 sf

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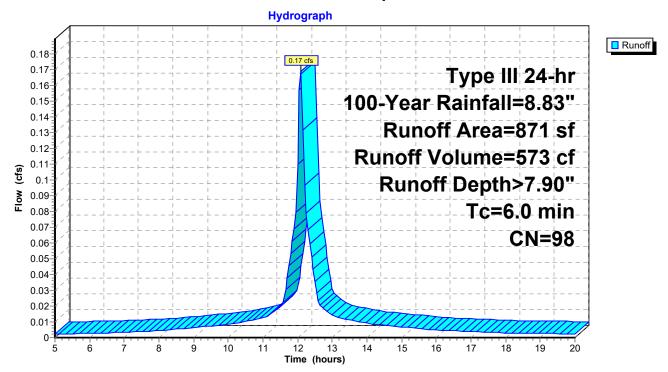
## **Summary for Subcatchment 1S: Proposed Roof**

Runoff = 0.17 cfs @ 12.09 hrs, Volume= 573 cf, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.83"

A	rea (sf)	CN [	Description		
	871	98 F	Roofs, HSC	Α	
	871	1	00.00% In	npervious A	urea
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Tc = 6 min

# **Subcatchment 1S: Proposed Roof**



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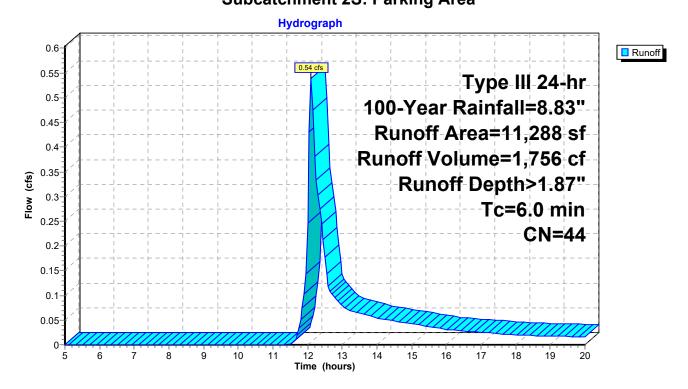
## **Summary for Subcatchment 2S: Parking Area**

Runoff = 0.54 cfs @ 12.11 hrs, Volume= 1,756 cf, Depth> 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.83"

Area (s	f) CN	Description	Description							
1,02	6 98	Paved park	Paved parking, HSG A							
10,26	2 39	>75% Gras	s cover, Go	ood, HSG A						
11,28	8 44	Weighted A	verage							
10,26	2	90.91% Pei	90.91% Pervious Area							
1,02	6	9.09% Impe	ervious Are	a						
Tc Lenç (min) (fe	,	,	Capacity (cfs)	Description						
6.0				Direct Entry, Tc = 6 min						

# **Subcatchment 2S: Parking Area**



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# **Summary for Subcatchment 3S: Site & Restoration Areas**

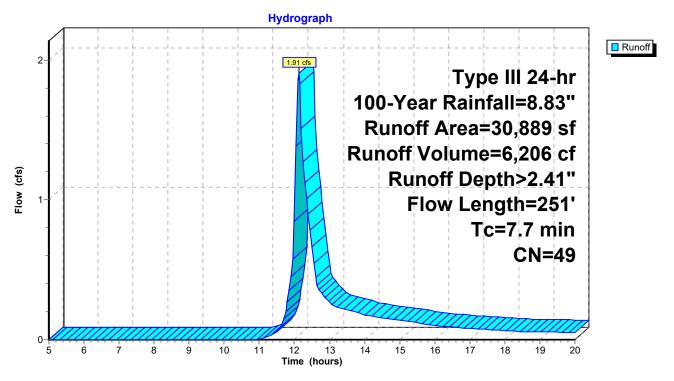
Runoff = 1.91 cfs @ 12.12 hrs, Volume= 6,206 cf, Depth> 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.83"

	Д	rea (sf)	CN	Description							
		10,257	39	9 >75% Grass cover, Good, HSG A							
		1,520									
*		3,382	98	•							
		13,060	· · · · · · · · · · · · · · · · · · ·								
2,670 96 Gravel surface, HSG A											
		30,889	49	49 Weighted Average							
		25,987		84.13% Pervious Area							
		4,902		15.87% Impervious Area							
	Тс	Length	Slope	•	Capacity	Description					
(	(min) (feet) (ft/ft) (ft/sec) (cfs)		(cfs)								
	5.6	.6 50 0.0200 0.15			Sheet Flow, First 50'						
						Grass: Short n= 0.150 P2= 3.22"					
0.3		45	0.0200	2.28		Shallow Concentrated Flow, Next 45'					
						Unpaved Kv= 16.1 fps					
1.3 113 0.0050 1.		1.44		Shallow Concentrated Flow, Next 113'							
						Paved Kv= 20.3 fps					
	0.5	43	0.0500	1.57		Shallow Concentrated Flow, Last 43'					
						Short Grass Pasture Kv= 7.0 fps					
	7.7	251	Total								

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#### **Subcatchment 3S: Site & Restoration Areas**



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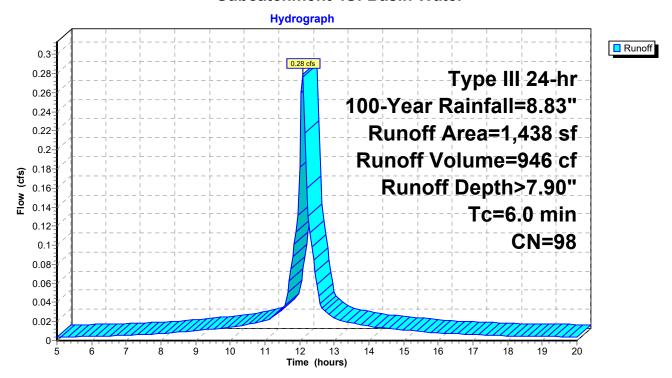
## **Summary for Subcatchment 4S: Basin Water**

Runoff = 0.28 cfs @ 12.09 hrs, Volume= 946 cf, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.83"

A	rea (sf)	CN E	CN Description						
	1,438 98 Water Surface, HSG A								
	1,438	100.00% Impervious Area							
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description				
6.0					Direct Entry, Tc = 6 min				

#### Subcatchment 4S: Basin Water



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## **Summary for Reach DP-1: Design Point 1**

[40] Hint: Not Described (Outflow=Inflow)

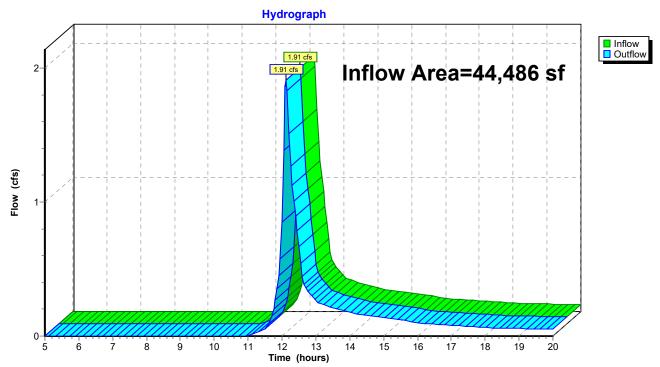
Inflow Area = 44,486 sf, 18.52% Impervious, Inflow Depth > 1.67" for 100-Year event

Inflow = 1.91 cfs @ 12.12 hrs, Volume= 6,206 cf

Outflow = 1.91 cfs @ 12.12 hrs, Volume= 6,206 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

# Reach DP-1: Design Point 1



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### **Summary for Pond 1P: Basin**

[82] Warning: Early inflow requires earlier time span

Inflow Area = 13,597 sf, 24.53% Impervious, Inflow Depth > 2.89" for 100-Year event
Inflow = 0.98 cfs @ 12.10 hrs, Volume= 3,276 cf
Outflow = 0.09 cfs @ 13.72 hrs, Volume= 2,800 cf, Atten= 91%, Lag= 97.1 min
Discarded = 0.00 cfs @ 13.72 hrs, Volume= 2,800 cf
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 310.05' @ 13.72 hrs Surf.Area= 1,565 sf Storage= 1,331 cf

Plug-Flow detention time= 151.3 min calculated for 2,790 cf (85% of inflow) Center-of-Mass det. time= 105.6 min (891.9 - 786.3)

Volume	Invert	Avail.9	Storage	Storage Description	n			
#1	309.00'	3	3,073 cf	Custom Stage Data (Irregular)Listed below (Recalc)				
Elevation	on Si	urf.Area	Perim.	Inc.Store	Cum.Store	Wet.Area		
(fee	et)	(sq-ft)	(feet)	(cubic-feet)	(cubic-feet)	(sq-ft)		
309.0	00	995	190.0	0	0	995		
310.0	00	1,540	229.0	1,258	1,258	2,312		
311.0	00	2,106	166.0	1,816	3,073	4,302		
Device	ice Routing Invert Out			et Devices				
#1	Discarded	309.0	0' <b>2.41</b>	0 in/hr Exfiltration over Surface area				
			Conductivity to Groundwater Elevation = 100.00'					
#2	Primary	310.5		' long x 6.0' breadt				
	•		Head	d (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00				
			2.50	3.00 3.50 4.00 4.	50 5.00 5.50			
			Coef	. (English) 2.37 2.5	51 2.70 2.68 2.68	2.67 2.65 2.65 2.65		
			2.65	2.66 2.66 2.67 2.	69 2.72 2.76 2.83	3		

**Discarded OutFlow** Max=0.09 cfs @ 13.72 hrs HW=310.05' (Free Discharge) **1=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=309.00' (Free Discharge) 2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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# Pond 1P: Basin

